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IS 14267-3 (1995): Quick Frozen Vegetables, Part 3: Quick Frozen Spinach [FAD 10: Processed Fruits and Vegetable Products]



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शीघ्र हिमीकृत सब्जियाँ — विशिष्ट

भाग 3 शीघ्र हिमीकृत पालक

Indian Standard

**QUICK FROZEN VEGETABLES —
SPECIFICATION**

Part 3 QUICK FROZEN SPINACH

UDC 664.85.037.5 [635.41]

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BUREAU OF INDIAN STANDARDS
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FOREWORD

This Indian Standard (Part 3) was adopted by the Bureau of Indian Standards, after the draft finalized by the Processed Fruits and Vegetable Products Sectional Committee had been approved by the Food and Agriculture Division Council.

Quick frozen vegetables are the products subjected to a freezing process, in an appropriate equipment, carried out in such a way that the range of temperature of maximum crystallization is passed quickly. The quick freezing process is not regarded as complete unless the product temperature has reached -18°C at the thermal centre after thermal stabilization.

Quick frozen vegetables are gaining popularity in India, due to convenience in their storage, handling and use, as well as their ready availability all round the year, irrespective of season.

To provide guidelines for ensuring the quality of these products, this Indian Standard has been formulated in different parts, each part dealing with a specific vegetable. Part 3 deals with quick frozen spinach and is based on CODEX STAN 77-1981 'Quick frozen spinach', published by the Codex Alimentarius Commission.

In the preparation of this standard, due consideration has been given to the provisions of the *Prevention of Food Adulteration Act, 1954 and Rules framed thereunder* and also to the *Fruit Products Order, 1955 and the Standards of Weights and Measures (Packaged Commodities) Rules, 1977*. The standard is subject to the restriction imposed under these, wherever applicable.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

QUICK FROZEN VEGETABLES — SPECIFICATION

PART 3 QUICK FROZEN SPINACH

1 SCOPE

This Standard (Part 3) prescribes the requirements and methods of the sampling and test for quick frozen spinach of the species *Spinacia oleracea* L.

2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Whole Spinach (Loose Leaves)

The intact spinach plant with root removed.

3.2 Leaf Spinach

Substantially whole leaves most of which are separated from the root crown.

3.3 Cut-Leaf Spinach

Parts of leaves of spinach generally larger than 20 mm in the smallest dimension.

3.4 Chopped Spinach

Parts of leaves of spinach cut into small pieces, generally less than 10 mm in the largest dimension, but not comminuted to a pulp or puree.

3.5 Pureed Spinach (Spinach Puree)

Spinach finely divided or finely chopped or having passed through a sieve such that the leaf particles are less than 3 mm.

3.6 Discoloration

Discoloration of any kind on the leaves or stem portions and which materially detracts from the appearance of the product.

3.6.1 Minor

Discoloration which is light in colour.

3.6.2 Major

Discoloration which is dark in colour.

3.7 Extraneous Vegetable Matter (EVM)

Harmless vegetable material, such as grass, weeds and straw.

3.7.1 Minor

EVM which is green and tender.

3.7.2 Major

EVM which is other than green or is coarse.

3.8 Seed Heads (Flower Stems)

The flower bearing portion of the spinach plant, which is longer than 25 mm.

3.9 Flower Buds

The separate flower buds detached from the seed head.

3.10 Crown (Exclusive of Whole Style)

The solid area of the spinach plant between the root and the attached leaf clusters.

3.11 Root Material

Any portion of the root, either loose or attached to leaves.

4 REQUIREMENTS

4.1 Description

Quick frozen spinach is the product prepared from fresh, clean, sound edible parts of the spinach plant conforming to the characteristics of the species *Spinacia oleracea* L., and which have been sorted, washed sufficiently and properly drained to ensure adequate stability of colour and flavour.

4.2 Styles

The product may be presented in one of the following styles defined in 3.1 to 3.5:

- a) Whole spinach,
- b) Leaf spinach,
- c) Cut leaf spinach,
- d) Chopped spinach, and
- e) Pureed spinach.

4.3 Optional Ingredients

4.3.1 Salt

4.3.2 Condiments, such as Spices and Herbs

4.3.3 Food Additives

As permitted under PFA Rules.

4.4 General Requirements

4.4.1 The product shall be of a reasonably uniform green colour, characteristic of the variety.

4.4.2 The product shall be free from any foreign flavours and odours other than those imparted by any added optional ingredients.

4.4.3 The product shall be clean, sound and free from sand, grit and other foreign material. It shall also be free from fibrous material and for the styles of whole leaf and cut leaf not materially disintegrated due to mechanical damage.

4.4.4 The product in pureed style shall be free from any dark particles or flower buds which affect the overall appearance of the product.

4.5 Absence of Visual Defects

The product shall be free from visual defects or other defects as defined in 3.6 to 3.11 subject to a tolerance as given in Annex B.

4.6 The product shall comply with the requirements given in Table 1.

5 HYGIENIC PRACTICE

5.1 The product shall be processed and handled in accordance with the hygienic practices given in IS 14134 : 1994.

6 PACKING

The product shall be packed either in wax-coated paper board cartons or in food grade plastic packs or containers.

7 MARKING

7.1 The following information shall be clearly and indelibly marked on the product:

- a) Name of the product;
- b) Name and address of manufacturer;
- c) Batch or code number;
- d) Month and year of manufacture;
- e) Net mass;
- f) Style of the product;
- g) List of ingredients, arranged in descending order of proportions;
- h) Information for keeping and thawing of the product;
- j) The words 'Best before ...' (month and year to be indicated); and
- k) Any other details required under the *Standards of Weights and Measures (Packaged Commodities) Rules, 1977; Prevention of Food Adulteration Rules, 1955 and Fruits Products Order, 1955.*

Table 1 Requirements for Quick Frozen Spinach
(Clause 4.6)

Sl No.	Characteristic	Requirement	Method of Test, Ref to	
			Annex of this Standard (4)	Other Indian Standard (5)
(1)	(2)	(3)	(4)	(5)
i)	Mineral Impurities (sand, grit and silt), percent by mass, <i>Max</i>	0.1	—	IS 13816 : 1993
ii)	Salt-free dry matter, percent by mass, <i>Max</i>	5	C	
iii)	Metallic Contaminants:			
	a) Arsenic, mg/kg, <i>Max</i>	1.0	—	13 of IS 2860 : 1964
	b) Lead, mg/kg, <i>Max</i>	2.5	—	14 of IS 2860 : 1964
	c) Copper, mg/kg, <i>Max</i>	5.0	—	15 of IS 2860 : 1964
	d) Zinc, mg/kg, <i>Max</i>	5.0	—	16 of IS 2860 : 1964
	e) Tin, mg/kg, <i>Max</i>	250	—	17 of IS 2860 : 1964
	f) Iron, mg/kg, <i>Max</i>	15.0	—	Annex B of IS 7732 : 1975
iv)	Microbiological Requirements:			
	a) Bacterial plate count, colonies per gram, <i>Max</i>	50 000	—	IS 5402 : 1969
	b) Coliform plate count, per gram, <i>Max</i>	5	—	IS 5401 : 1969
	c) <i>Escherichia coli</i> , per gram	Absent	—	IS 5887 (Part 1) : 1976
	d) <i>Staphylococcus aureus</i> , per gram	Absent	—	IS 5887 (Part 2) : 1976
	e) <i>Clostridium perfringens</i> , per gram	Absent	—	IS 5887 (Part 4) : 1976

7.2 BIS Certification Marking

The product may also be marked with the Standard Mark.

7.2.1 The use of the Standard Mark is governed by the provisions of Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted

to manufacturers or producers may be obtained from the Bureau of Indian Standards.

8 SAMPLING

The method of drawing representative samples of the material and criteria for conformity shall be as given in 3 of IS 2860 : 1964. However, sample size and tolerance for visual defects shall be in accordance with Annex B.

ANNEX A

(Clause 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	Title	IS No.	Title
2860 : 1964	Methods of sampling and test for processed fruits and vegetables		<i>aureus and faecal streptococci (first revision)</i>
5401 : 1969	Method for detection and estimation of coliform bacteria in foodstuffs	(Part 4) : 1976	Isolation and identification of <i>Clostridium welchii</i> , <i>Clostridium botulinum</i> and <i>Bacillus cereus</i> and enumeration of <i>Clostridium welchii</i> and <i>Bacillus cereus</i> (first revision)
5402 : 1969	Method for standard plate count of bacteria in foodstuffs		
5887	Methods for detection of bacteria responsible for food poisoning:	7732 : 1975	Apple juice
(Part 1) : 1976	Isolation, identification and enumeration of <i>Escherichia coli</i> (first revision)	13816 : 1993/	Fruit and vegetable products —
(Part 2) : 1976	Isolation, identification and enumeration of <i>Staphylococcus</i>	ISO 762 : 1982	Determination of mineral impurities content
		14134 : 1994	Code for hygienic practices for units for processing and handling of quick frozen foods

ANNEX B

(Clause 4.5)

TOLERANCES FOR VISUAL DEFECTS

B-1 STANDARD SAMPLE SIZE

The standard sample size for segregating and evaluating visual defects shall be as follows:

Style	Standard Sample Size
Whole and leaf	300 g
Cut leaf	300 g
Chopped	100 g
Pureed	100 g

B-2 METHOD OF EXAMINATION

For separation and enumeration of visual defects the test sample (standard sample size) is placed in

water in a deep tray, and the leaves or leaf portion separated one by one.

B-3 TOLERANCES FOR VISUAL DEFECTS

B-3.1 Any standard sample unit taken in accordance with the sampling plans given in 3 of IS 2860 : 1964, shall be assigned points in accordance with Table 2. The maximum number of defects permitted is the total allowable points rating indicated for the respective categories, minor, major and serious or the combined total of these categories.

**Table 2 Total Allowable Points Rating for Visual Defects for Whole Leaf,
Cut Leaf and Chopped Styles
(Clause B-3.1 and B-3.2)**

Sl No. (1)	Defect (2)	Unit of Measurement (3)	Defect Categories			Total (7)
			Minor (4)	Major (5)	Serious (6)	
i)	Loose Leaves: (Whole style only)	Each Leaf	1			
ii)	Discoloration: (whole leaf and cut leaf style)	Each 4 cm ²				
	(Chopped style)	Each cm ²				
	a) Minor		1			
	b) Major			2		
iii)	EVM: (for whole leaf and cut leaf style)	Each 5 cm				
	(for chopped style)	Each 1 cm				
	a) Minor		1			
	b) Major			2		
iv)	Seed heads: (for whole leaf style)	Each whole head		2		
	(for cut leaf style)	Each portion	1			
v)	Crowns: (for whole style)	Each whole crown		2		
		Each part	1			
vi)	Crown material: (for chopped style)	Each piece		2		
vii)	Root material: (For whole leaf and cut leaf style)	Each piece			4	
	(For chopped style)	Each piece		2		
Total allowable points: (For whole leaf and cut leaf style)			20	10	4	20
(For chopped style)			20	10	—	20

B-3.2 Any standard sample unit shall be regarded as defective if it exceeds the total allowable points rating in any one or more of the defect categories, as given in Table 2, as appropriate for the style.

A lot is considered acceptable with respect to visual defects when the number of 'defectives' as defined in B-3 does not exceed the acceptance number (c) for the appropriate sample size as specified in col 4 of Table 1 of IS 2860 : 1964.

B-4 LOT ACCEPTANCE FOR QUALITY FACTORS

ANNEX C

(Table 1)

DETERMINATION OF SALT-FREE DRY MATTER

C-0 GENERAL

In order to obtain the salt free dry matter in frozen spinach, subtract the sodium chloride content (see C-2) from the total dry matter (see C-1)

C-1 DETERMINATION OF TOTAL DRY MATTER

C-1.1 Determine the total dry matter of the product by drying a known mass of the product over sand for 4 hours at 105°C.

C-1.2 From the loss of mass observed, calculate the percentage of dry matter (g₁).

C-2 DETERMINATION OF SODIUM CHLORIDE

C-2.1 The Method given in 11 of IS 2860 : 1964 shall be followed for determination of percentage of sodium chloride content (g₂).

C-3 EXPRESSION OF RESULTS

Salt free dry matter, percent by mass (g) shall be expressed as follows :

where $g = g_1 - g_2$

g = Salt free dry matter, percent by mass;

g_1 = Total dry matter, percent by mass;

g_2 = Sodium chloride content, percent by mass.

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